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our instinctive knowledge of equilibrium and of a motion of the body as a whole depends on very complex sensory impressions. One of these is very probably the pressure due to inertia of the perilymph and endolymph of the semi-circular canals, but it is quite possible that the inertia and weight of the soft parts of the head and body are more important factors. Rotation of the body would tend to cause congestion of the brain cortex by centrifugal action, and the resulting dizziness would be analagous to that accompanying intoxication or fever. The position of the body as a whole affects not only the circulation of the blood, but also the pressure of brain, viscera, etc., and the alterations in the direction in which gravity acts would cause important changes in muscular tensions. Motion of the body as a whole would cause pressure of the soft parts of the body on those more hard, and skin sensations (due to inertia of the body as a whole) would occur at points where the body touches other things. Sensations from the soles of the feet are of great delicacy, being part of the reflex mechanism which enables us to stand upright.

CONSCIOUSNESS AND THE ORIGIN OF SPECIES.

PROFESSOR COPE contributes to the July number of *The Monist* an article in which he formulates with great clearness the *Present Problems of Organic Evolution*. He sums up the positions of the Neo-Lamarckians and Neo-Darwinians in the accompanying table. It is of special interest to the present writer owing to the definition of the place of consciousness in the two theories, thus calling attention to the relations of modern psychological research and evolutionary theories. The general result of psychological investigation seems to increase the difficulties and decrease the need of assuming consciousness in causal interaction with the physical world, whereas the biologist finding physical causes insufficient ad-

1. Variations appear in definite directions.

2. Variations are caused by the interaction of the organic being and its environment.

3. Acquired variations may be inherited.

4. Variations survive directly as they are adapted to changing environments (natural selection).

5. Movements of the organism are caused or directed by sensation and other conscious states.

6. Habitual movements are derived from conscious experience.

7. The rational mind is developed by experience, through memory and classification.

1. Variations are promiscuous or multifarious.

2. Variations are 'congenital,' or are caused by mingling of male and female germplasmas.

3. Acquired variations cannot be inherited.

4. Variations survive directly as they are adapted to changing environments (natural selection).

5. Movements of organism are not caused by sensation or conscious states, but are a survival through natural selection from multifarious movements.

6. Habitual movements are produced by natural selection.

7. The rational mind is developed through natural selection from multifarious mental activities.

duces consciousness as a *vera causa* in the origin of species. J. McK. C.

SCIENTIFIC NOTES AND NEWS.

THE PARALLAX OF ETA CASSIOPEÆ DEDUCED FROM THE RUTHERFURD PHOTOGRAPHIC MEASURES.*

THE new value of the parallax of this well-known binary star is not without considerable interest in view of the fact that it depends upon several pairs of comparison stars, thus eliminating largely, though, of course, not entirely, the disadvantages arising from the unknown parallaxes of the stars of comparison; whereas, in the two previous investigations by O. Struve and by Schweizer respectively, only *one* star has been used, and that probably the same star in both investigations, and one in such

*Based on Contributions from the Observatory of Columbia College, New York. No. 6. By Herman S. Davis.

a position relative to the proper motion of γ Cassiopeæ as to be most largely affected by any error in the assumed value thereof. Moreover, the value of $+.''154$ obtained by Struve has received a much larger share of credence than the circumstances connected with obtaining it would warrant—Struve himself saying of it: “la plus grande difficulté se rencontra dans les observations de γ Cassiopeæ à cause d’une distance de 5’ pour l’étoile de comparaison, distance qui atteint déjà les limites extrêmes de la bonne visibilité dans le champ de notre lunette.” This is incidentally referred to by the author (page 305), where reference is given also to a remark, not very dissimilar, made by Socoloff relative to Schweizer’s observations. Thus it may be seen that the want of near-by stars renders the determination of the parallax of this star very difficult, especially by micrometric observations; and though this difficulty is considerably lessened by the larger field of the Rutherford photographic plates, yet even now stars farther from the centre of the plate than would have been desirable under more favorable conditions had to be chosen. This seems not to have vitiated the result, for the values of parallax obtained from the separate pairs are, with one exception, accordant within the limits of their probable errors. This exception may be due to a parallax or, not possibly, to a proper motion of one or other of the comparison stars. This uncertainty, and the fact that the pairs g, h and i, j were, as the writer believes, included more to throw light upon the presence or absence of film-distortion than upon the parallax, has influenced Dr. Davis to prefer the first of the two values he publishes, namely:

$$\pi = + 0.''443 \pm 0.''038 \text{ from three pairs,}$$

the other value being

$$= + 0.''465 \pm 0.''034 \text{ from six pairs.}$$

Using the first value, therefore, and the

elements of this binary system as given by Dr. See in *Ast. Journ.* 343, it is interesting to note that the distance of this star from the earth is about seven and one-third ‘light years’ and that the combined mass of Eta and its companion is only .175 as great as the mass of our sun, and that the relative orbit in which these two stars revolve about this common centre of gravity is very nearly equal to that in which the planet *Neptune* circles about the sun.

THE MARINE BIOLOGICAL LABORATORY.

IN the prefatory note to the biological lectures delivered at Woods Holl, 1894, Professor Whitman writes as follows: “When the first volume of these lectures was offered, in 1890, their continuance as an annual publication was thought of only as a possibility; it was not promised, nor, indeed, suggested. The usefulness of such lectures had only been tested by a single summer’s experience; and, although it was certain that they served a good purpose in the work of the laboratory, the advisability of publishing them was doubtful. While the reception accorded to the two volumes already issued indicates that it would not now be presumptuous to announce the hope of continuing them, it would be rash to promise this in the present state of uncertainty regarding the future of the laboratory. The laboratory is an experiment to test the extent of our need and the possibility of securing general coöperation. It has furnished a demonstration in both these respects; but it remains to be seen whether this will suffice to bring to it the necessary foundation of a large endowment. Special thanks are due to those who, in reviewing the ‘Biological Lectures,’ have called attention to the nature and purpose of this experiment and to the high importance of the end proposed. The project appeals, not for government support, but to private munificence, and every authoritative con-

firmation of its merits adds strength to our effort." There is perhaps no institution in America accomplishing more for the advancement of science with a limited expenditure and none more deserving of a larger endowment.

THE POPULATION OF FRANCE.

It is well known that the lack of increase of the population of France causes serious anxiety to its statesman. M. Chervin has recently presented some statistics before the *Société d'Anthropologique* which we quote from *The Lancet*. The table gives in the first column the number of legitimate living children born per thousand women aged between fifteen and fifty years. The corresponding number of illegitimate children is given in the second column.

German Empire.....	270.....	26.5
Scotland.....	269.....	19.9
Belgium.....	265.....	19.8
Italy.....	251.....	24.6
England.....	250.....	12.1
Austria.....	250.....	44.4
Sweden.....	240.....	(?)
Ireland.....	240.....	4.1
Switzerland.....	236.....	10.2
France.....	163.....	16.7

M. Rochard has recently attributed the low birth rate in France to alcoholism. The annual consumption of alcohol is 6.45 centiliters per person per annum, and there is in Paris one wine shop for every three houses. The birth rate is, however, undoubtedly due largely to French social customs—to prodigality in Paris and thrift in the provinces.

KARL LUDWIG'S LIBRARY.

THE physiological library of the late Professor Ludwig is offered for sale by Th. Stauffer, 26 Universitäts Str., Leipzig, who has in preparation a catalogue which he will send on application. It would be a great advantage if some American institution could purchase the library as a whole.

The library includes 10,000 memoirs, pamphlets and dissertations on anatomy, physiology and related subjects, which are offered for 6,000 marks. In addition, several valuable sets of journals are for sale. As it is becoming continually more difficult to secure sets of these journals, we give the following details:

Annalen der Chemie und Pharmacie (1832–1893) 2,500 M. Annalen der Physik und Chemie (1824–1892) 2,650 M. Zoölogischer Anzeiger (1878–1893) 160 M. Archiv für Mikroskopische Anatomie (1865–1895) 1,300 M. Archiv für Physiologie (1877–1894) 420 M. Bericht über die Fortschritte der Anatomie und Physiologie (1856–1871) 50 M. Berichte der Deutschen Chemischen Gesellschaft (1868–1893) 600 M. Centralblatt für die Medicinischen Wissenschaften (1–33) 200 M. Die Fortschritte der Physik (1845–1888) 450 M. Medicinische Jahrbücher (1871–1888) 150 M. Jahresbericht über die Fortschritte der Anatomie und Physiologie (1873–1893) 330 M. Jahresbericht über die Fortschritte der Chemie Physik u. Mineralogie (1847–1893) 775 M. Jahres Bericht über die Fortschritte der Thierchemie (1871–1893) 300 M. Göttinger Nachrichten (1862–1894) 95 M. Proceedings of the Royal Society of London (1866–1895) 300 M. Philosophische Studien (1883–1895) 120 M. Philosophical Transactions of the Royal Society of London (1875–1894) 600 M. Zeitschrift für Analytische Chemie (1862–1883) 270 M.

THE AMERICAN PHILOLOGICAL ASSOCIATION.

THE twenty-seventh meeting of the American Philological Association was held at Western Reserve University on July 12th, under the presidency of Professor John Henry Wright, of Harvard University, who delivered an address on the 'Function of the Imagination in Classical Philology.' More than twenty papers were

presented before the meeting, among which may be mentioned as of general scientific interest an address by Professor George Hempl, of the University of Michigan, who exhibited some 'American speech maps' showing the geographical distribution of various dialectical peculiarities, and a description by Professor Schmidt-Wartenberg, of Chicago, of Rowsselot's phonetical apparatus which, it is hoped, will facilitate the study of speech from a physical standpoint. The report of the committee appointed at the Philadelphia meeting last winter to take steps toward some practical outcome of the following resolution: "That in the opinion of the American Philological Association, in any programme designed to prepare students for the classical course, not less than three years of instruction in Greek should be required," was presented. The action of the committee in drawing up and widely distributing an address on this subject was approved by the Association.

The next meeting will be held at Providence, R. I., on July 7, 1896.

GENERAL.

PROFESSOR W. RAMSAY read a paper before the Chemical Society of London on June 20th, in which he stated that there is no doubt but that argon and helium contain as a common ingredient a gas not hitherto identified, two lines in the spectra in the newly discovered elements being identical. The atomic weight of the new gas would be about 10. In the issue of *Nature* for July 4th Professor Ramsay states that he has demonstrated the presence of both argon and helium in a meteorite from Augusta County, Virginia. The characteristic spectrum of argon is almost completely masked by the presence of a few parts per cent. of nitrogen or of hydrogen, and that of helium is similarly affected, though to a less degree. In so far as the lines of the argon spectrum

have not been identified in the spectra of stars it is probably because they are masked by the spectra of hydrogen and carbon.

IN the *American Naturalist* for July an account is given of the Hopkins Seaside Laboratory. The laboratory is located at Pacific Grove, a seaside resort on the southern shore of Monterey Bay, about four hours distant by train from San Francisco. The coast line at this point offers every variety of rocky and sandy shores, and the variety and abundance of marine life is exceptionally great. The original building contains three general laboratories, a store room and seven private rooms for investigators; the new building contains a general lecture and library room, a general laboratory, ten private rooms for investigators and a dark room for photographic work. The basement is designed for large aquaria. The buildings are supplied with running water, both salt and fresh. The session (which is the fourth) began on June 17th, and the regular course of instruction continues till July 17th, but investigators and students not requiring instruction may continue their work during the summer.

ACCORDING to the *Genie Civile*, quoted in the *Scientific American*, the Geographical Society of Toulouse has for some years been studying the possibility of the application of the decimal system to the measurement of time and angles. As a result of these studies, a scheme has been devised which is to be presented to the coming Geographical Congress in London. It is proposed to divide the circle into 100 'cirs' (abbreviation of *circulus*), with decimal subdivisions of 'decirs,' 'centicirs,' 'millicirs' and 'dimicirs.' The letter X (initial letter of Greek *κυκλος*) is chosen to represent the cir, and an angle of 7 cirs, 77 centicirs and 51 dimicirs would, therefore, be written 7^x7751. For the decimal measurement of time, the day, from midnight to midnight, is di-

vided into 10 decimal hours, each hour into 10 'cés' (abbreviation of centijour), each cé into 10 'décicés' or decimal minutes, and the latter into 'centicés,' 'millicés,' 'dimicés,' etc.

M. M. DELEBECQUE and Le Royer's report to the Paris Academy that they have found that the quantity of air dissolved in water in the Lake of Geneva is independent of the pressure of the water, being slightly greater (owing to the decrease of temperature) at the bottom than at the surface.

THE *Société d'encouragement pour l'industrie nationale* held its annual meeting for the distribution of the awards of the Society on June 28th. A large number of prizes and medals were awarded, among which may be mentioned the large prize of 12,000 francs awarded every six years for the invention most useful to French industry, which was given to M. G. Lippmann for the invention of color photography. The large gold medal awarded every three years for the work that has exercised the greatest influence on French industry during the six preceding years was awarded to the 'Comité de l'Afrique française' for their publications. Among the prizes is one awarded to the artisan who has worked for the greatest number of years in a chemical factory.

At the meeting of the Astronomical and Physical Society of Toronto, held July 9th, Mr. Thomas Lindsay read the introductory chapter to a series of papers which it is his intention to present as an historical sketch of the Greenwich Nautical Almanac, which was claimed to be next to the Bible the greatest production of the printing press.

A STATE civil service examination will be held in Albany on August 6th for candidates for the position of fish culturist in the State Fish, Game and Forest Commission. The salary is \$3,000.

THE British Medical Journal states that the following names of distinguished scien-

tific and medical men will be given to different Paris streets: Trousseau, Charcot, David Ulysse Trélat, Milne Edwards, Jean Baptiste Dumas.

THE Pan-American Congress of Religion and Education met at Toronto from the 18th to the 25th of July.

A SPECIMEN of the egg of the great auk was recently sold in London for £173-5-0. This specimen, which is perfect, was taken in Iceland some 60 or 70 years ago and comes from the collection of Baron d'Hamonville.

HENRY HOLT & Co. announce for publication an authorized translation of Paulsen's 'Introduction to Philosophy,' by Prof. Frank Thilly, of the University of Missouri, with a preface by Prof. William James, of Harvard University.

At the meeting of the Paris Academy of Sciences, on June 4th, Prof. Fuchs was elected correspondent in geometry in the place of Weierstrass; Dr. Nansen was elected correspondent in the section of geography, succeeding Nordenskiöld, and Dr. Lavarán correspondent of the section of medicine and surgery in the place of Hannover.

THE *Botanical Gazette* announces the death of Julian Deby, known for his study of diatoms.

UNIVERSITY AND EDUCATIONAL NEWS.

THE University of Pennsylvania has issued an appeal asking for an endowment fund of \$5,000,000 to meet the immediate requirements of the University. Mr. Thomas McKean has given without restrictions a sum of \$50,000 in addition to the \$50,000 given a few month ago. A contribution of \$10,000 has also been received from Mr. Richard F. Loper to name a house in the new dormitory. It is stated that this is the thirteenth contribution of a similar kind that has been received.